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ABSTRACT

The first section of this report lists a variety of advantages and disadvantages of educational applications of Local Area Networks (LANs), with descriptive and evaluative comments on how the Union County Computers in the Curricula Network Project (Cranford, New Jersey) dealt with each. The second section of the report describes the following major applications of the Union County Computer Network: (1) writing courses for English as a Second Language students, developmental writing courses, and developmental math courses; (2) a writing across the curriculum program; (3) tutorial instruction; (4) an electronic mail service; and (5) an inservice workshop. (RS)

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COMPUTERS IN CURRICULA PROGRAM FOR NETWORKED COLLEGE LEVEL WRITING PROCESS INSTRUCTION: A FIRST YEAR REPORT

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General Description of the Project

The Union County (Cranford, NJ) Computers in the Curricula Network Project was funded by a state grant of $53,600 and by UCC institutional support of $21,073. Approximately 4/5 of that funding was spent on purchase and installation of the hardware and software. The hardware included a Corvus network system and hard disk for increased memory, Apple IIe microcomputers, with four ImageWriter II printers. Microcomputers were set on 6-foot tables, two computers per table, allowing room for students books and papers. A nearby laboratory of isolated Apple IIe microcomputers, in existence prior to grant funding, had two additional printers.

General Evaluation: Local Area Network Advantages and Disadvantages

A survey of the literature on educational applications of LANs indicates a variety of advantages and disadvantages (Peyton & Batson, 1986; Mason, 1987; Zier, 1987; Johnson, 1988; McCarthy, 1988). The following section contains a list of these, with descriptive and evaluative comments on how the UCC network project dealt with each.

1. Advantage: Easier Management of Software

The most frequently cited advantage of Local Area Networks involves the ease in management of software by removal of the need to monitor the wide array of floppy disks characteristic of educational microcomputer laboratories. Iler, for example, noted that without a LAN, "teachers spend more time swapping disks than instructing" (1987, p. 4).

School administrators purchasing non-LAN microcomputer laboratories have generally underestimated the serious nature of this problem. Time spent in low-level management tasks takes highly trained teachers away from key instructional roles. Such problems also create teacher frustration and boredom, decreasing their motivation and enjoyment of the teaching/learning process. The confusion arising from managing a disk library results in decreased efficiency of instructional delivery in a system that had specifically been purchased to increase efficiency.

At UCC, instructors agreed that the LAN increased the ease with which students could access software. Rather than taking time at the beginning and end of each class to distribute floppy disks, students could immediately access the necessary software directly from the hard drive.

2. Advantage: Increased Interaction

The dominant school of research on writing instruction, the Writing Process school, has criticized traditional writing instruction as an artificially individualized operation. Key proponents of writing process (e.g., Graves, 1983; Calkins, 1986) have suggested that teachers need to be more involved during the actual draft writing stages of writing, and that teachers should build a sense of authorial community among students. Rather than students writing as individuals, they should see themselves as colleagues, critiquing one another's compositions in an effort to develop fine-honed products.

In their work using LANs to teach writing to deaf and English as a Second Language students, Peyton and Batson noted that LANs help writers to avoid being "solitary and monologic" (1986, p. 1). Johnson has also noted that, "In the long run, the argument for LANs may rest more on their potential to facilitate learning through shared interaction than on their supposed convenience or cost effectiveness" (1988, p. 10). Thompson, in an evaluation of a LAN used for similar instructional purposes to the one used at UCC, noted that the LAN allowed students and teachers to function better as a class, to use time "more productively in structured writing and revision activities and interactive written discourse" (1987, p. 95).

Instructors at UCC also noted the usefulness of the LAN in this regard. Communication was improved by the ease with which messages could be sent from one terminal to another among students and from teacher to student. The LAN was used to

foster intercommunication and cooperative learning, to structure a new kind of learning environment for students.

3. Disadvantage: Technical Problems

The most common criticism of LANs is technical (Jonnson, 1988). Set-up is complex and time-consuming. Users must expect inevitable problems during start-up weeks. Breakdowns will certainly occur during operation.

The UCC project team carried out initial set-up in an exemplary fashion. This success has been due to a number of factors:

1. Sufficient funding. Funding for hardware, software, and staffing was exemplary. Many other projects have suffered severely from underfunding, especially in the area of staffing, as planners rarely appreciate the amount of time needed for set-up and maintenance of a computer laboratory, nor for the time needed to revise curricula and methods to fit the LAN. The UCC project team indicated that funding for technical staff was satisfactory for set-up.

The project suffered a minor delay due to some relatively inexpensive pieces of missing hardware. Future projects will benefit from provision of an emergency fund of money that is immediately available and can be used by project staff to make purchases expeditiously.

2. Experienced technical staff. The technical start-up was greatly enhanced by the experience of its staff network

consultant, who had earlier supervised a similar LAN start-up at the UCC-Elizabeth campus. This consultant also supervised the account system by which students and faculty accessed the network.

3. Capable installers. A capable and experienced firm was hired to install the Corvus network system. Its employees performed helpfully and professionally. The UCC team made only minor changes in the basic installation:

a. Computer paper for printers was placed on shelves rather than on the floor, as students tended to step on it.

b. Casters were removed from printer stands, as students leaning over the printers would move the stands and pull out plugs.

4. On-going on-site maintenance. A student was hired to be readily available in an on-going way to solve problems as they occurred.

5. Gradual phase-in of operations. Instructors gradually moved to take greater advantage of the LAN's capabilities during the Spring, 1988, semester. The speed of transfer of operations to the LAN was determined in large part by the instructor's assessment of class progress. This resulted in a particularly smooth start-up for the individual instructors and did not overwhelm the support staff.

6. Sufficient in-service training, both in initial start-up and on-going. In-service training of instructors is crucial (McCarthy, 1988). The UCC project team expressed consistent agreement that they had received sufficient support. In order to

maintain success, however, this support must continue beyond the duration of the grant, both to the present project team and to future users of the system.

4. Disadvantage: Down time

A key problem with LANs is that technical problems with the hard drive can render the entire system inoperable. This is a particularly serious problem when schools choose to employ a LAN in order to economize. The financial savings derives from not purchasing disk drives for each microcomputer.

The UCC project wisely decided to avoid this false economy. Each Apple microcomputer has a floppy disk drive. In the event of a hard disk failure, students could carry on their work by loading software via the floppy disk drives. In addition, students were required to save copies of their files on their own floppy disks, thereby ensuring that the class could be carried on in the event of down time or the more serious possibility of a hard disk crash that destroys computer memory.

Disadvantage: Limited Software

Another common criticism of LANs is the limited availability of instructional software for use on a LAN. The UCC team wisely chose the Corvus System, which supports more third party software than any other LAN (Lehrer, 1988). Software available for use on the Corvus System is listed in a comprehensive directory

published by Sterling Swift Publishing Company, Austin, TX. Corvus is the LAN most frequently used in education (McCarthy, 1988). The widespread availability of software has already been of significant help in the Mathematics Project, where Educational Activities, Inc. software is in use. It will be of further help in the future should instructors decide to employ a greater variety of instructional software for skill development. The Corvus system is also very adaptable, which is a strength as the system is flexible to satisfy each instructor's individuality.

This disadvantage does have its effects, however, in the word processing applications. The AppleWorks word processing software is not presently designed for LANs, and at least one problem has developed. Students must be warned that no more than two or three should save their files at the same time, or they will be lost and the student's original file disk will be erased. This is a serious problem. Some suggestions:

1. Investigate the possibility of using DOS-management programs such as the one published by Beagle Brothers to restore lost files. This operation will demand technical expertise.

2. Post signs warning students of the problem.

3. Inform instructors to avoid announcing at the end of a class period that the class should save their programs. Instructors should stagger saves.

Summary of Findings and Recommendations

Short-Range

1. Released Time and Overload Time. Instructors reported that the grant had allowed sufficient released and overload time for their training and for their revision of course structure to make best use of the LAN. This instructor time is vital for successful implementation of any new educational strategy, especially those involving hardware and software complexities. It is recommended that the college continue to be generous in granting released and overload time to the five instructors presently on the grant so that they can help train new instructors. All instructors active on the grant project from 1987-1988 have indicated willingness to continue their involvement, since the project was so successful. It is also recommended that new instructors beginning to use the LAN be granted similar amounts of released and overload time.

2. Lab staffing. The staffing of the microcomputer laboratory during non-class hours is vital for smooth operation. Staff can answer students' technical questions, as well as help students with assignments. It is recommended that this staffing be continued. In addition, trained technical staff must be readily available for consultation if technical problems develop. These staff must be familiar with the technical makeup of all software and hardware, including the Corvus system, AppleWorks, ProDOS, and so forth.

3. Writing Across the Curriculum. This is an innovative program (see below for description) that deals with the tremendous difficulty of "transfer of skills"--helping students transfer the skills they learn in developmental writing classes to their

content area coursework. As of present, this program will not continue to be funded. The innovative quality of this program might increase the possibility that additional grant funds could be found to continue funding. It is recommended that UCC seek additional grant funding for the future while continuing institutional funding of this program in the interim.

4. Software Purchases. Initial software purchases have been informed and wise. Continued funding should be provided so that additional software can be purchased:

a. Mathematics software. The Educational Activities software suffers from an underdeveloped management system. In addition, new and innovative mathematics software will undoubtedly appear in the next few years.

b. Prewriting software. A wide variety of prewriting software is available to lead students through brainstorming and composition planning, important parts of the composing process (Calkins, 1986). These programs ask questions of students to help them begin compositions. They serve to teach through modeling the prewriting process. Suggestions are listed in Balajthy (1986), and include such programs as Mimi Schwartz's PreWrite.

c. Postwriting software. Two primary types of software will be particularly helpful to instructors and students. Spelling checkers will help students identify and learn words they typically misspell and remove the low-level burden of correcting spelling from instructors. Style analyzers check certain matters of grammar and style and offer suggestions to students for improvement. Suggestions for purchase are listed in

Balajthy (1989), and include such programs as Sensible Grammar and GhostWriter.

5. Expansion of the Network System. Successful implementation of this networking system has its limits in terms of number of students served. Some concern was expressed by the instructors that the network is already overused, as response time is slowed down if all computers are in use (and it will be slowed even more dramatically if more microcomputers are added to the existing system) and two classes that use the system are held simultaneously and only one can be on the system at a time. In addition, there are only 21 stations and some classes have 28 students.

Inability to take students to the system obviates its usefulness. If instructors, for example, are only allowed to take one of their two sections of a course to the network, they will be forced to do twice the planning--an unfair imposition, one that increases the burden on the instructor rather than making instruction more efficient, which is the purpose of the LAN. Some suggestions:

a. Carefully limit the number of instructors and students using the LAN. Quality use with a few sections is superior to the confusion that will be created by overloading the LAN.

b. Schedule LAN-using classes and instructors so that they have free access to the LAN.

c. Consider options possible for obtaining one or more additional LANs, so that more students can be served.

6. New Applications. It is suggested that the college very

carefully evaluate implementation of new applications on the LAN to avoid overloading the system. Inconvenience created by overloading the system--such as by overusing hard-disk space or by conflicting schedules of classes whose instructors wish to use the LAN--will quickly obviate the advantages of such a system. While there are many potential new applications for the LAN (such as use of the AppleWorks spreadsheet for accounting classes or the AppleWorks database for history and English classes), the limitations of the LAN should be considered realistically.

7. New Instructors. Instructors presently involved in the grant program should be given priority for using the LAN in their classes. New instructors should be trained only as there is space on the LAN User Schedule for new classes. Training would most efficiently be carried out by giving new instructors released time or overload time to learn LAN operations and to revise their course curricula to include the LAN. Efficiency would also be enhanced by providing those instructors who are presently using the LAN released time or overload time to teach new instructors.

8. The Older, Independent Microcomputer Laboratory. The compatibility of microcomputers in both the older and new laboratories is a very real advantage. I suggest that hardware and software in the older laboratory be made fully compatible with the newer LAN laboratory. That is, 80-column cards must be purchased and installed, and AppleWorks should immediately replace AppleWriter as the word processor in the older laboratory.

9. Whole-Class Instruction. As the user schedule in the LAN

classroom becomes more crowded, other computer-based teaching techniques can be used so that each class need not go to the laboratory each session. This would allow two simultaneously scheduled classes to take advantage of the LAN, as necessary. I suggest that an Apple IIe computer, equipped with an overhead projection device, be installed in the classrooms used by the developmental classes. This would allow instructors to carry on whole-class demonstration and modeling of revision and editing, without consistently tying up the laboratory.

10. Desktop Publishing. The one aspect of the writing process that is not fully taken advantage of by the developmental writing classes is the motivational power of "publication" (Balajthy and Link, 1988). I suggest that UCC purchase an Apple IIGS microcomputer for the laboratory, with an accompanying desktop publishing package. GraphicWriter (DataPak Software, Inc., 14011 Ventura Blvd. # 507, Sherman Oaks, CA 91423, 818-905-6419) would allow students to print their compositions using the existing ImageWriter II printers in multiple column, multiple color, and multiple font formats, and incorporate charts, diagrams, and other graphics in the printout.

Long Range

11. Permanent Installation. UCC should look to the future in terms of its long-range goals for LAN usage, both in developmental education and in other facets of the curriculum. Long-range planning should include permanent room facilities and hardware capable of servicing the entire developmental student

population. This should include provision for security and noise elimination, as well as increased ease of instructor access to the LANs through microcomputers installed in their offices and wired to the LANs.

Current Applications of the UCC Network

Grant funding for establishment of the UCC Network began in the Fall semester of 1987. By Spring semester, 1988, initial planning and purchasing had been carried out and the network was installed. During the Spring, 1988, semester, the five initial instructors began to phase students out of using isolated microcomputer workstations into using the LAN. This section deals with each of the major applications of the LAN in turn.

ENG 111 and 112

Description. ENG 111 and 112 are writing courses for English as a Second Language students. In accordance with contemporary writing process theory, emphasis is placed on actual writing experiences rather than grammar drillwork. The course centers on six writing assignments that are carried through the writing process, with planning, revising, peer, tutor, and professor editing, and completion of the final draft.

Students use AppleWorks and save their initial drafts on floppy disks. Their first submission is via the LAN to a tutor, who accesses the student file, reads the paper on the monitor,

and makes comments on the paper using the LAN E-mail message system. Students then continue revision of the paper and eventually submit a copy of the paper via the LAN to the course instructor, who in turn makes suggestions for a final revision.

Evaluation. The UCC Network has been phased into the course smoothly, with a minimum of disruption. Students are able to use the LAN with few problems, and the increased ease of access has greatly enhanced the power of word processing for revision and editing of papers. The instructor reports a significant increase in the length of papers submitted by students. There has also been an increase in the amount of consultation with tutors. Students often submit papers several times to tutors via the LAN. This increase in consultation reflects the ease of consultation made possible by the LAN.

ENG 098 and 099

Description. Students are placed into these developmental writing classes if their scores fall below the cutoff on the writing component of the New Jersey Basic Skills Placement Test. While there are some differences between instructors, emphasis is placed primarily on actual writing of approximately six compositions of about 600 words each and guidance of students through the writing process. Students write in reaction to readings, or they write based on their journal entries.

Evaluation. Instructors were enthusiastic about the role of word processing in improving the quality of instruction and

learning. Students were successfully transferring their AppleWriter word processing skills to the new hardware and the new software, AppleWorks, with a minimum of disruption, though it is apparent that less confusion will be created in the future if students who begin working at the independent microcomputer workstations be provided with the same software they will be using later at the LAN, AppleWorks. The LAN allowed great ease of communications. Tutors would typically work one-on-one with students, providing advice with the compositions and making corrections and suggestions using the word processor.

Instructors reported a lower drop-out rate from the course, decreased tedium in revision, and increased motivation for working, effects that are commonly reported in research on use of word processors in the classroom. The instructors encouraged students to seek input from other peers. Students were encouraged to meet in pairs at the monitor screen to peer edit compositions and make immediate revisions. There was a good deal of evidence of students consulting with one another at the computer screen during composing--a cooperative learning experience that tends not to happen when in a traditional writing situation.

Instructors suggested that the project seek to provide multiple-column word processing software, in which a student's composition might appear on the right half of the monitor screen and instructor/tutor comments be placed on the left. At present, software that makes this operation easy to carry out does not exist for the Apple IIe.

The instructors noted that, due to initial confusions with

AppleWorks, they have to be very flexible in accepting hard-copy printouts that have pagination and margin-arrangement problems. Students need to be reminded to backup their compositions every ten or fifteen minutes. Also, personal contact between instructors, tutors, and students is maintained as the written comments conveyed to the students on the electronic mail system bring the students to the instructors for in-person elaboration.

MAT 011 and 022

Description. Students are placed in these developmental math classes if they fail the math component of the New Jersey Basic Skills Placement Test. As of the April evaluation, these classes were the only classes employing the LAN for direct instruction in skills, using a Computer Assisted Instructional (CAI) package published by Educational Activities, Inc. Students completed one hour per week in the laboratory, working on CAI tutorial and drill and practice lessons that were coordinated with class content, such as on the topics of whole numbers, fractions, and percentages.

Evaluation. The instructor reported increased motivation on the part of students engaged in mathematics drillwork using the computer. The LAN had eliminated the need for complicated disk management, as students could access each component of the software package directly from the hard disk. The increased motivation was especially evident in the three-hour evening section of the course. The computer-based instruction served as

an important stimulus variation for increased course effectiveness.

There is a need to wait for more sophisticated software which will probably become available in the near future from publishers. The Educational Activities package is slow paced, especially for the more advanced students. The instructor has adapted the instructional setup so that students may take a posttest on each unit before completing the lessons, so that students who have already mastered the concept can skip unnecessary work and go on to more relevant lessons. The instructor also uses a Conduit, Inc., program to teach algebra. This is not available on the LAN, and the independent microcomputer workstations are used.

Writing Across the Curriculum

Description. This component of the project involved an innovative attempt to deal with the problem of helping students in regular academic courses to use writing to show what they have learned in the courses. In working with the writing consultant, the students had to shape their material for an audience with complex needs. 10 chemistry students, 5 psychology students, and 4 literature students were involved. Chemistry and psychology assignments centered on a 6-8 page term paper. Literature students completed 2 or 3 shorter papers.

The students used the word processing component of the LAN to work on their composition and report assignments from content area courses. They worked in conjunction with the instructor,

who is the director of this component of the grant, who provided them with LAN-based feedback and guidance at various draft stages in their writing. The instructor also met with each student at least once in person. Compositions and reports were then submitted for final grading to the content area instructors. The instructor also worked closely with the content area course instructors.

Evaluation. This was an innovative and important attempt to deal with the critical problems of audience awareness and structuring material for complex audience needs. The instructor particularly noted the advantage of students working on compositions in conjunction with instructor-provided feedback prior to going to hard copy. This Writing Across the Curriculum project is highly motivational to students, as it involves the teaching of writing skills in conjunction with very meaningful activities--the content area coursework. As of present plans, the program will not be funded beyond the Spring, 1988, semester. It would be unfortunate to lose such a potentially valuable program.

Tutorial Component

Description. Tutorial instruction is a central component of any effective developmental program. The supervisor supervised the four tutors involved in working with the UCC Network. Two faculty members participated in training the tutors.

Evaluation. The supervisor reported that training of the

tutors to use the LAN had proceeded smoothly, and that the transfer from isolated microcomputers to the LAN had worked out well in improving ease of access to compositions and ease of communication between students and tutors. The bulk of training required by the tutors remains non-electronic: Training in the level and type of feedback to give students on content, style, and mechanics of compositions.

Instructors noted that the procedures used on the LAN solved a common tutorial problem. That is, faculty using tutors often received papers from students that are as much the tutor's efforts as the student s. The tutors, in an effort to help the students, practically write the papers themselves. In using the LAN, tutors did not rewrite the papers. Instead, they sent general messages and feedback to the students via the electronic mail system. The students were left with the task of doing the revisions.

Academic Learning Center Interactive Message Facility

Description. The electronic mail component of the LAN allows messages to be sent between students, tutors, and faculty. Instructors can leave messages for entire classes, or send notes or comments on compositions to individual students.

Evaluation. The system has a limited capability for whole class instruction, as instructors can place compositions on the monitor screens during class time for interactive, whole-class editing. The system's capabilities in this respect were limited in that each student has to access the proper file, a time-

consuming task. Use of a large screen projector for such exercises would probably be more time efficient.

In general, the electronic mail component greatly facilitates the sending of messages between students and tutors and instructors. This resulted in increased access by students to the tutors for feedback. Unfortunately, the Let's Talk software used had some limitations. Instructors, for example, were not able to erase single messages from their "mailboxes." Either a different program should be used, or a more complex mailbox arrangement is needed.

Inservice Workshop

A local computer consultant presented an inservice workshop to the Project Staff and to 10 additional members of the English Department. The workshop was entitled "Computer Applications in Composition." The workshop involved participants in such activities as a computer-based rank ordering task, proofreading and revising tasks, blind writing, and use of shell documents.

Evaluation forms filled out by the participants indicated that the workshop was very well received. Activities ranked as most effective on the evaluation form included: Rank ordering task, working with peers at the computer, on-screen revision exercise, and blind writing exercise.

Evaluation

Evaluation of the project was made by Dr. Ernest Balajthy, Associate Professor in the Department of Elementary and Secondary Education and Reading at State University of New York at Geneseo. Evaluation was based on two visits, one in mid-Spring semester and the second at the end of the Spring semester. A Preliminary Report was delivered to the instructors in early April to provide a formative evaluation. A Final Evaluation Report, which incorporated the Preliminary Report as well as additional instructor feedback, was delivered in early June, 1988.

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